MARKED-UP AMENDED SPECIFICATION

Please substitute the following paragraph for the paragraph starting at page 1, line 10 and ending at line 16. A marked-up copy of this paragraph, showing the changes made thereto is attached.

--In an image reading apparatus used in a copying machine or the like, a stepping motor has heretofore been used because highly accurate positioning of a movable member is required. To drive the movable member of the image reading apparatus at a high speed with low vibration by the stepping motor, the [through-up and through-down] acceleration and deceleration of the motor are requisite.--

Please substitute the following paragraph for the paragraph starting at page 1, line 17 and ending at line 21. A marked-up copy of this paragraph, showing the changes made thereto is attached.

--Also, to read color information, reading at a constant speed, free of vibration, is necessary and therefore, it is popular in the design of the apparatus to provide an approach run distance required until the vibration created after [through-up] the acceleration becomes null.--

Please substitute the following paragraph for the paragraph starting at page 1, line 22 and ending at page 2, line 5. A marked-up copy of this paragraph, showing the changes made thereto is attached.

--Also, regarding the vibration in the constant speed portion of the motor rotation, the motor becomes a vibration source due to a torque ripple conforming to a step angle and the thin lines of an image become jaggy. [Against] To combat this problem, it is possible to use a magnet

damper [which] that does not [give an] add to the inertia to [a] the motor shaft during the aforementioned [through-up] acceleration operation, but [gives] adds to the [an] inertia to the motor shaft [during] when it is moving at a constant speed for the reason set forth later, to thereby smooth the rotation between step angles, and it is possible to reduce the vibration.--

Please substitute the following paragraph for the paragraph starting at page 2, line 9 and ending at line 20. A marked-up copy of this paragraph, showing the changes made thereto is attached.

--However, the [reading number of] number of images read by the image reading apparatus per unit time has become higher [in speed] year by year and therefore, it has become impossible to secure a sufficient approach run distance. Also, when the inertia working during acceleration is [attached] added to the motor shaft, the [through-up] acceleration time increases and a higher speed [has become] becomes impossible and a very great inertia could not be given. Therefore, the vibration components of the distal end of a read image have become [many] large and the [said] distal end [has become] of the read image becomes jaggy, and this has caused a great reduction in the [dignity] quality of the image.--

Please substitute the following paragraph for the paragraph starting at page 2, line 21 and ending at line 25. A marked-up copy of this paragraph, showing the changes made thereto is attached.

--The reason set forth above has become a factor for greatly reducing the [dignity] quality of the produced image by being jaggy or a factor for hindering the downsizing of the apparatus by the increase in the approach run distance resulting from a higher reading speed.--

Please substitute the following paragraph for the paragraph starting at page 3, line 1 and ending at line 4. A marked-up copy of this paragraph, showing the changes made thereto is attached.

--The present invention has been made in view of the above-noted situation and an object thereof is to provide a motor apparatus reduced in vibration caused during acceleration and during operation at a constant speed.--

Please substitute the following paragraph for the paragraph starting at page 3, line 12 and ending at line 15. A marked-up copy of this paragraph, showing the changes made thereto is attached.

--Yet still another object of the present invention is to use a magnet damper and a rubber damper to shorten the reading time of an image [reading time] to thereby [heighten] increase the speed of the apparatus.--

Please substitute the following paragraph for the paragraph starting at page 3, line 24 and ending at line 25. A marked-up copy of this paragraph, showing the changes made thereto is attached.

--Fig. 3 is a [simple] schematic, simple view of a moving mechanism provided with only a magnet damper.--

Please substitute the following paragraph for the paragraph starting at page 3, line 26 and ending at page 4, line 1. A marked-up copy of this paragraph, showing the changes made thereto is attached.

--Fig. 4 [shows] is a graph showing the relation between the state of the vibration of a first mirror of an image reading apparatus and the speed of a motor shown in Fig. 3.--

Please substitute the following paragraph for the paragraph starting at page 4, line 2 and ending at line 3. A marked-up copy of this paragraph, showing the changes made thereto is attached.

--Fig. 5 is a schematic simple equivalent view of the motor using only the magnet damper shown in Fig. 3.--

Please substitute the following paragraph for the paragraph starting at page 4, line 4 and ending at line 7. A marked-up copy of this paragraph, showing the changes made thereto is attached.

--Fig. 6 is a schematic simple view of a moving mechanism according to an embodiment of the present invention using two damper means, i.e., a magnet damper and a rubber damper.--

Please substitute the following paragraph for the paragraph starting at page 4, line 8 and ending at line 9. A marked-up copy of this paragraph, showing the changes made thereto is attached.

--Fig. 7 is a schematic simple equivalent view of a motor using only a rubber damper.--

Please substitute the following paragraph for the paragraph starting at page 4, line 10 and ending at line 12. A marked-up copy of this paragraph, showing the changes made thereto is attached.

--Fig. 8 is a graph showing shows the relation between the state of the vibration of the first mirror of the image reading apparatus and the speed of the motor shown in Fig. 7.--

Please substitute the following paragraph for the paragraph starting at page 4, line 13 and ending at line 15. A marked-up copy of this paragraph, showing the changes made thereto is attached.

--Fig. 9 [shows] is a perspective view showing the construction of the moving mechanism of the image reading apparatus shown in Fig. 2.--

Please substitute the following paragraph for the paragraph starting at page 4, line 20 and ending at line 22. A marked-up copy of this paragraph, showing the changes made thereto is attached.

--Fig. 12 is a schematic, simple equivalent view of a motor using the magnet damper and the rubber damper shown in Fig. 6.--

Please substitute the following paragraph for the paragraph starting at page 4, line 25 and ending at page 5, line 2. A marked-up copy of this paragraph, showing the changes made thereto is attached.

--Fig. 1 is a block diagram of the image processing circuit of the digital full color copying machine of the present invention. The reference numeral 100 designates the main substrate of the image processing circuit, which includes the following parts.--

Please substitute the following paragraph for the paragraph starting at page 5, line 15 and ending at line 21. A marked-up copy of this paragraph, showing the changes made thereto is attached.

--The CCD 101 used in the present embodiment comprises three CCD line sensors for R (red), G (green) and B (blue) disposed at predetermined distances. Therefore, the digital image signals are signals having a time deviation created by spatial deviation. This time deviation is corrected in a three lines connecting portion 104 in Fig. 1.--

Please substitute the following paragraph for the paragraph starting at page 6, line 7 and ending at line 10. A marked-up copy of this paragraph, showing the changes made thereto is attached.

--[A] An F value correction portion is a correction table for correcting a density value (F value) for each color in accordance with the designation of the density at which printing is to be effected.--

Please substitute the following paragraph for the paragraph starting at page 6, line 11 and ending at page 7, line 5. A marked-up copy of this paragraph, showing the changes made thereto is attached.

--The reference numeral 108 designates a tristate buffer, which is controlled by an ADD-IN signal. The reference numeral 110 denotes an image processing substrate provided with a tristate buffer 111 and an image processing portion 112. The image processing portion 112 is a portion for effecting such processing as extracting the outline portion of an image. The reversed signal of the ADD-IN signal is inputted to the tristate buffer 111. Therefore, the tristate buffer

111 and the tristate buffer 108 are in a converse relation so that if one of them becomes a buffer with a high impedance, the other may become a buffer with a low impedance. Accordingly, when the ADD-IN signal is "1", the tristate buffer 108 becomes a buffer with a high impedance and an image signal flows through the masking/UCR portion 107, the image processing portion 112, the tristate buffer 111, and the F value correction portion 109 in the named order. [When conversely,] Conversely, when the ADD-IN signal is "0", the tristate buffer 111 becomes a buffer with a high impedance and an image signal flows through the masking/UCR portion 107, the tristate buffer 108, and the F value correction portion 109 in the named order.--

Please substitute the following paragraph for the paragraph starting at page 7, line 9 and ending at line 21. A marked-up copy of this paragraph, showing the changes made thereto is attached.

--This apparatus is provided with original supporting glass 202 for supporting an original 201 thereon on the upper portion thereof, and an original supporting table cover 203 for keeping the supported original 201, and below these, there is provided an optical system comprised of an original illuminating lamp 209, a first mirror stand 204, a second mirror stand 205, an imaging lens 206, a color CCD (fixed image element) line sensor (corresponding to CCD 101 in Fig. 1, and hereinafter referred to as the line sensor) 207 having a filter (not shown) for resolving three colors, i.e., R (red), G (green) and B (blue), and an image processing circuit 208.--

Please substitute the following paragraph for the paragraph starting at page 7, line 22 and ending at page 8, line 4. A marked-up copy of this paragraph, showing the changes made thereto is attached.

--A mirror 210 is fixed to the first mirror stand 204, and mirrors 211 and 212 are fixed to the second mirror stand 205. A CPU 213 is connected to the image processing circuit 208, the operation of which is controlled by the CPU 213. Also, the design [is] of the device is made such that the original illuminating lamp 209 has its operation controlled by the CPU 213 through a driving circuit, not shown, and the first and second mirror stands 204 and 205 have their operations controlled by the CPU 213 through a driving mechanism, not shown.--

Please substitute the following paragraph for the paragraph starting at page 8, line 9 and ending at line 22. A marked-up copy of this paragraph, showing the changes made thereto is attached.

--The original 201 placed on the original supporting glass 202 is illuminated by the original illuminating lamp 209. The reflected light from the original is directed by the mirrors 210, 211 and 212, and is imaged on the line sensor 207 through the imaging lens 206. The reflected light is resolved into an R component, a G component and a B component as color image information by the color resolving filter of the line sensor 207, and thereafter is sent to the image processing circuit 208. By the electrical scanning (main scanning) by the line sensor 207 and the mechanical scanning (sub-scanning) by the original illuminating lamp 209 and the mirrors 210 to 212 being repeated, the image information of the whole area of the original is read.--

Please substitute the following paragraph for the paragraph starting at page 8, line 27 and ending at page 9, line 9. A marked-up copy of this paragraph, showing the changes made thereto is attached.

--Fig. 9 is a perspective view showing a moving mechanism for the image reading apparatus to be moved. This construction is an already known construction used in a popular flat bed type image reading apparatus. In order to scan the original, the original illuminating lamp 209, which is an illuminating source, and the first mirror 210 are moved at a predetermined speed as indicated, for example, [by] in the direction of the arrow, and the second and third mirrors 211 and 212 are moved at a half speed of the predetermined speed.--

Please substitute the following paragraph for the paragraph starting at page 9, line 10 and ending at line 18. A marked-up copy of this paragraph, showing the changes made thereto is attached.

--For this purpose, rotation is transmitted from a motor 40 to a rotary shaft 44 through a belt 42, and the rotation of the rotary shaft 44 is further transmitted to a belt 48 passed over a pulley 46, and the original illuminating lamp 209, which is the illuminating source, and the first mirror 210 are carried on the first mirror stand 204 attached to the belt 48, and the second and third mirrors 211 and 212 are carried on the second mirror stand 205.--

Please substitute the following paragraph for the paragraph starting at page 9, line 19 and ending at line 25. A marked-up copy of this paragraph, showing the changes made thereto is attached.

--Assuming now that the original image is read when the first mirror stand 204 and the second mirror stand 205 are moved in the direction indicated by the arrow, to obtain an image of high [dignity] quality that [which is] has little [jaggy] jaggedness, it is desirable that the vibration

of the first mirror stand and the second mirror stand is [little to the] as small as possible [utmost].--

Please substitute the following paragraph for the paragraph starting at page 9, line 26 and ending at page 10, line 5. A marked-up copy of this paragraph, showing the changes made thereto is attached.

--So, in the present invention, a magnet damper has been chosen from among a plurality of kinds of dampers [which] that can be mounted on the motor shaft, and this magnet damper has been examined. In the construction of a moving mechanism having this magnet damper mounted thereon, vibration has occurred when the first mirror 210 is [through-up] accelerated to a predetermined speed.--

Please substitute the following paragraph for the paragraph starting at page 10, line 26 and ending at page 11, line 5. A marked-up copy of this paragraph, showing the changes made thereto is attached.

--In Fig. 3, this reference numeral 310 designates a magnet damper which is of a construction [having] to add inertia [connected] to the motor shaft by the action of a magnet, and is of such a construction [which] that does not react to or add inertia to the shaft during the accelerating operation, such as the acceleration or deceleration of the motor shaft, but [has an] adds inertia when the motor shaft is operated at a constant speed.--

Please substitute the following paragraph for the paragraph starting at page 11, line 6 and ending at line 20. A marked-up copy of this paragraph, showing the changes made thereto is attached.

--Fig. 11 shows the configuration of the magnet damper. The reference numeral 1101 designates the inertia member of the magnet. The reference numeral 1103 denotes a hub made of iron. The reference numeral 1102 designates a rulon made of a material of a low coefficient of friction such as Teflon. During the acceleration of the motor, the hub 1103 and the inertia member 1101 of the magnet slidingly move because the rulon 1102 is mounted on the motor shaft and therefore, the inertia of the magnet damper applied to the motor shaft is weak. On the other hand, when the motor shaft is rotated at a constant speed, the hub 1103 and the inertia member 1101 of the magnet are rotated therewith and therefore, the inertia of the magnet damper is applied to the motor shaft [is applied].--

Please substitute the following paragraph for the paragraph starting at page 11, line 21 and ending at page 12, line 8. A marked-up copy of this paragraph, showing the changes made thereto is attached.

--Fig. 5 shows a simple equivalent view of a motor using only a magnet damper. In Fig. 5, the reference numerals 501 and 502 designate springs, and the reference numeral 503 (corresponding to the reference numeral 301 in Fig. 3) denotes a motor [which] that provides a vibration source together with the springs 501 and 502. The reference numeral 504 indicates that the inertia member 505 (corresponding to the reference numeral 1101 in Fig. 11) of the magnet and the motor 503, which is a vibration source, are connected together. Since it is

connected by the magnet, the inertia member 505 does not react during acceleration, and the design of the device is made such that when the motor is at a constant speed, the inertia member 505 is applied to the motor 503, which is a vibration source.--

Please substitute the following paragraph for the paragraph starting at page 12, line 9 and ending at page 13, line 2. A marked-up copy of this paragraph, showing the changes made thereto is attached.

--It is Fig. 4 that shows the relation between the state of the vibration of the first mirror stand 306 when the motor is [through-up] accelerated and the speed of the motor. In Fig. 4, the reference numeral 401 designates a waveform showing the state of the attenuation of vibration caused during the [through-up] acceleration of the motor, and the axis [of] in the Y-direction indicates acceleration G, and the axis in the X-direction indicates time t. The reference numeral 402 denotes the [through-up] acceleration waveform of the motor, and the Y-direction axis represents speed and the X-direction axis represents time t. In the waveform 402, the reference 20 numeral 404 designates an acceleration area, the reference numeral 405 denotes an approach run area for eliminating the vibration produced during the [through-up] acceleration, and the reference numeral 406 designates an image reading area for reading an image when the vibration during the [through-up] acceleration becomes null. In a moving mechanism having only a magnet damper mounted thereon, a time tl was necessary from after the starting of the motor until the vibration during the [through-up] acceleration was attenuated and image reading became possible.--

Please substitute the following paragraph for the paragraph starting at page 13, line 3 and ending at line 7. A marked-up copy of this paragraph, showing the changes made thereto is attached.

--Here, the present invention [has thought out to mount] mounts one more damper on the motor shaft having a magnet damper mounted thereon, and has chosen as [said] the [one more] additional damper a rubber damper from among a plurality of kinds of dampers mountable on the motor shaft. [.]--

Please substitute the following paragraph for the paragraph starting at page 14, line 1 and ending at line 11. A marked-up copy of this paragraph, showing the changes made thereto is attached.

--In Fig. 6, the reference numeral 610 designates a magnet damper designed to [have] add inertia [connected] to the motor shaft by a magnet, and it is of such a construction that it does not react or add inertia to the shaft during the accelerating operation of the motor, such as acceleration and deceleration, but [has] adds inertia [when] to the motor shaft [is] when the shaft operates at a constant speed. The reference numeral 611 denotes a rubber damper mounted on the motor shaft to reduce the vibration caused during the [through-up] acceleration.--

Please substitute the following paragraph for the paragraph starting at page 14, line 12 and ending at line 13. A marked-up copy of this paragraph, showing the changes made thereto is attached.

--The reason why the rubber damper has been chosen as [one more] the additional damper will now be described in detail.--

Please substitute the following paragraph for the paragraph starting at page 14, line 14 and ending at line 23. A marked-up copy of this paragraph, showing the changes made thereto is attached.

--Fig. 7 shows a simple equivalent view of a motor using only a rubber damper. In Fig. 7, the reference numerals 701 and 702 designate springs, and the reference numeral 703 (corresponding to the reference numeral 301 in Fig. 3) denotes a motor [which] that provides a vibration source together with the springs 701 and 702. The reference numeral 704 designates a spring, the reference numeral 705 denotes a dash pot, and the reference numeral 706 designates an [inertia] inertia-producing element, which is the equivalent constituent of a rubber damper 707.--

Please substitute the following paragraph for the paragraph starting at page 14, line 24 and ending at page 15, line 9. A marked-up copy of this paragraph, showing the changes made thereto is attached.

--Fig. 10 shows the configuration of the rubber damper. The reference numeral 1001 denotes an [inertia] inertia-producing element made of iron or the like. The reference numeral 1003 designates a hub [which] that is connected to the motor shaft. The reference numeral 1002 denotes a rubber material, and by the quality thereof, the characteristics of the spring 704 and the dash pot 705 are changed. Consequently, it becomes possible to load a spring-mass system by the rubber damper in conformity with the natural frequency of a load produced during the [through-up] acceleration and suppress vibration by the utilization of resonance (hereinafter referred to as the dynamic vibration absorption).--

Please substitute the following paragraph for the paragraph starting at page 15, line 16 and ending at line 21. A marked-up copy of this paragraph, showing the changes made thereto is attached.

--Consequently, the vibration during the [through-up] acceleration is reduced by varying the rubber material 1002 regarding the spring constant and the inertia 1001 and using them in accordance with the natural vibration frequency of the load during the [through-up] acceleration of an image reading system.--

Please substitute the following paragraph for the paragraph starting at page 15, line 22 and ending at page 16, line 3. A marked-up copy of this paragraph, showing the changes made thereto is attached.

--It is Fig. 8 that shows the relation between the state of the vibration of the first mirror stand 606 when the motor is [through-up] accelerated by the construction of the moving mechanism using this rubber damper and the speed of the motor. In Fig. 8, the reference numeral 801 shows the state of the attenuation of the vibration caused during the [through-up] acceleration of the motor, and the axis [of] in the Y-direction indicates acceleration G, and the axis [of] in the X-direction indicates time t.--

Please substitute the following paragraph for the paragraph starting at page 16, line 4 and ending at line 12. A marked-up copy of this paragraph, showing the changes made thereto is attached.

--The reference numeral 802 designates the [through-up] acceleration waveform of the motor, and the Y-direction axis represents speed and the X-direction axis represents time t. In

the waveform 802, the reference numeral 805 denotes an acceleration area, the reference numeral 806 designates an approach run area for eliminating the vibration caused during the [through-up] acceleration, and the reference numeral 807 denotes an image reading area for reading an image when the vibration during the [through-up] acceleration becomes null.--

Please substitute the following paragraph for the paragraph starting at page 16, line 13 and ending at line 18. A marked-up copy of this paragraph, showing the changes made thereto is attached.

--Here, the time t2 (803), from the starting of the motor until the vibration during the [through-up] acceleration is attenuated and image reading becomes possible, can be made shorter by Δt (804) than the time tl of the aforedescribed moving mechanism using only the magnet damper.--

Please substitute the following paragraph for the paragraph starting at page 16, line 19 and ending at page 17, line 2. A marked-up copy of this paragraph, showing the changes made thereto is attached.

--As described above, it is possible to reliably and efficiently reduce the natural vibration of the load system caused during the [through-up] acceleration of the motor by adding a rubber damper to the image reading drive system. [Thereby] As a result, the approach run time for absorbing the vibration caused during the [through-up] acceleration can be reduced and therefore, the image reading time can be shortened and this contributes to the higher speed of the apparatus. The approach run distance is also shortened and this contributes to the downsizing of the apparatus.--

Please substitute the following paragraph for the paragraph starting at page 17, line 3 and ending at line 15. A marked-up copy of this paragraph, showing the changes made thereto is attached.

--Thus, the present invention has paid attention to the fact that if as in the construction shown in Fig. 6, two damper means are mounted on the motor drive shaft, the vibration caused during the driving of the motor can be reduced, and has particularly derived the possibility of reducing the vibration caused during acceleration and during a constant speed by using a magnet damper as the first damper means and using a rubber damper as the second damper means, and utilizes this in the driving motor for the moving mechanism of an image reading apparatus to thereby shorten the reading time of the image reading apparatus and [heighten] <u>increase</u> the speed of the apparatus.--

Please substitute the following paragraph for the paragraph starting at page 17, line 19 and ending at page 18, line 8. A marked-up copy of this paragraph, showing the changes made thereto is attached.

--In Fig. 12, the reference numerals 701 and 702 designate springs, and the reference numeral 703 (corresponding to the reference numeral 301 in Fig. 3) denotes a motor, which provides a vibration source together with the springs 701 and 702. The reference numeral 704 designates a spring, the reference numeral 705 denotes a dash pot, and the reference numeral 706 designates inertia, which is the equivalent constituent of a rubber damper 707. The reference numeral 504 shows that an inertia member 505 (corresponding to what is designated by the reference numeral 1101 in Fig. 11) by a magnet and a motor 503 which is a vibration source,

are connected together. [Design] The design of the device is made such that the inertia member 505 does not react during acceleration because it is connected by the magnet, and when the motor is at a constant speed, the inertia member 505 is applied to the motor 503, which is a vibration source. --

Please substitute the following paragraph for the paragraph starting at page 18, line 9 and ending at line 16. A marked-up copy of this paragraph, showing the changes made thereto is attached.

--As described above, according to the present invention, during the [through-up] acceleration of the motor, it is possible to reliably and efficiently reduce the natural vibration of the load system by the rubber damper, and during the constant speed of the motor, it is possible to smooth the rotation between step angles by the magnet damper, and it is possible to reduce the vibration.--

MARKED-UP AMENDED ABSTRACT

Please substitute the following Abstract for the Abstract starting at page 22, line 1 and ending at line 12. A marked-up copy of this paragraph, showing the changes made thereto is attached.

--[The present invention, as the construction of an] An image reading apparatus used for a motor to scan an original for image reading, [provides] includes a first damper [means] mounted on the drive shaft of the motor to reduce vibration caused during acceleration for raising up to a target speed at the start of the load driving of the motor, and a second damper [means] mounted on the drive shaft of the motor to reduce vibration caused during the constant speed driving of the motor to thereby reduce vibration caused during the driving of the motor.--